

Opportunities in Chestnut Growing

By C. E. Parsons, Horticulturist

SINCE the chestnut bark disease has either destroyed or doomed the native growth throughout the Eastern States, chestnut growing now affords unusually attractive opportunities on the Pacific Coast.

This destructive disease which has prevented commercial planting in the East is not present on the coast, and rigid quarantine regulations, particularly in California, preclude its introduction.

An attractive local market is promised by the more than 300,000 Italians, said to reside in the Pacific West. Many Italians, in fact, class the chestnut with wine as an article of every day value in the diet. Not only the foreigners, however, but also American consumers of all classes, may be expected to use chestnuts in rapidly-increasing quantities.

A VALUABLE FOOD

For the possibilities of the chestnut as a valuable food are just beginning to be realized. Many have regarded it as a holiday luxury, but as a matter of fact, the chestnut has medicinal as well as food value. It is an easily-digested, energizing food, containing 10.7 per cent protein and a high percentage of crude fiber and ash, which together are said to aid digestion and promote intestinal activity. Furthermore, the chestnut is known to possess rare and valuable salts that aid in preventing hardening of the arteries.

The increasing interest in scientific eating and the growing number of vegetarians also would seem to indicate a profitable future market.

There are many delightful ways to use chestnuts other than eating in the ordinary roasted form. Epicures are fond of chestnut dressing for fowls. The nuts may be used in salads, as a substitute for potatoes and as a thickening material for soups or other foods. Blended with eggs or other foods, they may be made into croquettes.

MUST BE COOKED

The chestnut never should be eaten raw. The nuts may be roasted, boiled or baked. The flavor is due to the oil content and is brought out by cooking, yet the nut should not be subjected to a higher temperature than necessary. More and more of the nuts are being used by American housewives.

The fact remains, however, that the majority of the crop is sold on the streets of large cities by hot chestnut vendors who roast them over charcoal braziers and sell small glassfuls, at 5 or 10 cents each. Growers, therefore, strive to produce an early-maturing variety which will strike the holiday market. Larger, later-maturing varieties, such as the Marrons, or so-called Italian types, are preferred for culinary purposes and therefore are suitable for later markets.

LARGE QUANTITIES IMPORTED

These larger kinds also are used by the Latin peoples. Even with the comparatively limited demand, which by means of advertising and publicity, may be enormously increased, large quantities of oriental and Italian nuts are imported annually.

Practically all the chestnuts produced on the Pacific Coast are consumed

here. The Eastern markets prefer the small American Sweets, although great quantities of the European kinds are imported. The West in fact prefers the large European kinds and on this coast it is difficult to sell the small American Sweets. However, moderate sized nuts of extra good quality will sell after a specia market is developed.

Jobbers and commission houses in the cities, as well as fruit stands and fancy grocers handle large quantities of chestnuts.

The market for Pacific Coast nuts will be opening up in the East if the new tariff law includes the increased duty on chestnuts requested by Senator McNary of Oregon (namely, 5 cents a pound), but at present European nuts can be sold on the Atlantic seaboard, duty and ocean freight paid, for less than the cost of production to our growers. This duty also protects Pacific Coast growers against Oriental chestnuts, which sometimes are imported in such quantities that they must be sold at very low prices.

The chestnut is valuable, not only



Evidence That California Is a Good "Chestnut State"

Above, left—The young lady is standing near a 5-year-old grafted tree which carries a good crop. Right—A 15-year-old French chestnut (Marron Quercy) growing at 3000 feet altitude in Nevada County, Cal. Below—a pile of burrs showing appearance, as gathered from the tree.

for its fruit, but also as a shade tree, growing naturally to a great age and size. It makes a noble door-yard ornamental. It is recorded that a great chestnut in Totworth, England, still standing in 1881, was known as a boundary tree in the reign of King John, 1199 to 1216.

Because of its habit of growth, the tree when planted in an orchard, should be given plenty of room to prevent future crowding.

ADAPTS ITSELF READILY

That the tree takes naturally to California soils and climatic conditions is indicated by the fact that in the gold mining towns of California, trees planted by the early settlers, still stand in full vigor and productiveness. In fact, it may be safely said that no fruit-bearing tree that thrives in California will stand more neglect and abuse than the chestnut and still produce regular and profitable crops.

It will be seen, therefore, that thousands of acres of rough land in the foothills and higher districts of the Sierra Nevada are admirably adapted to chestnut culture. A deep, well drained, light gravelly soil is preferable, but chestnuts will succeed in heavy clay, if it is well drained and of good depth. Many mountain valleys, therefore, should be suitable. The red clay loams of the Sierras up to an altitude of three thousand feet and probably higher are exceptionally desirable, according to experiments conducted by the writer in Nevada County, California. Although exposure is comparatively unimportant, a southern exposure is least desired. For high altitudes and more northerly latitudes, earlier varieties should be selected.

YOUNG TREES GIVE PROMISE

Young plantings induced by observations of scattering old trees on this type of soil and at an altitude of three thousand feet have demonstrated the

great promise of this rather neglected tree.

A twenty-five year old door yard tree in Nevada County, producing about 300 pounds annually, brings the owner from \$45 to \$60 a year. This tree is on volcanic ash soil (Alken clay loam).

I know of many trees in Nevada County which although neglected for years, never fail to bear large crops.

Anyone who has land adapted to chestnut growing, either with or without irrigating water, well may consider planting a few acres to approved varieties.

Net returns of \$125 to \$250 or more per acre, may be expected from a 15-year-old planting and the revenue should increase up to 25 years.

The grower should remember also that he is planting this nut not for his profit alone, but also for the benefit of succeeding generations, since the tree is very long lived.

The growth is about as rapid as that of most fruit trees and the grove may be interplanted to peaches or other faster-growing fruits, or vegetables suited to soil and market conditions of the district.

Grafted chestnut trees bear in four years and many seedlings are very precocious, bearing good crops at five or six years.

Little skill is required to grow chestnuts successfully. Given proper soil conditions, the tree is less exacting in its requirements than any of the standard orchard types.

The pruning is simple, and spraying is unnecessary except for an occasional dormant lime sulphur wash; and this only when it seems desirable.

I have yet to hear of any insect pests damaging the chestnut trees on the Pacific Coast; in fact small boys seem to be the only serious pests in Nevada County!

PROPAGATION

Propagation of chestnuts is not easy; yet with care, both the seedlings and grafts may be made to grow. Seed for planting must be used while fresh. The nuts used for seed may be mixed with moist sand in the proportion of one-third nuts to two-thirds sand and kept in boxes in a cool cellar until they sprout, when they should be planted in well prepared soil, either where they are to stand permanently or in the nursery.

Another method of preserving the nuts which I have found very satisfactory, is to mix them with moist earth and leaves so that the whole is a loose mass. Then place in boxes with the tops level with the ground and cover with leaves. For protection from rodents, a small mesh wire netting should be placed over the top of the boxes. Occasionally all methods of care prove valueless and the nuts mould in spite of every precaution.

METHODS OF CULTURE

Following are brief outlines of methods of propagating, planting and care, based on the writer's observations and the experience of others:

Seedling trees grown from nuts taken from grafted trees come very true to type and many seedlings from nuts grown on seedling trees bear good crops—sometimes even better than the parent.

Since the chestnut is rather difficult to graft, the question of whether to use seedling trees (to be top-grafted) for orchard planting or the more expensive grafted trees, must be decided by each individual.

Grafted stock will bear sooner (first nuts in about four years) and will produce true-to-type nuts that will mature uniformly throughout the orchard, and considering every factor therefore, is cheaper in the long run.

Grafted trees cost from \$25 to \$35 an acre; seedlings one-half as much. The cost of stock in fact is about the same as that of fruit trees, but there is less planting expense, for there are fewer trees to the acre.

VARIETIES

Although much might be said of the different varieties, I will describe only those generally cultivated. These are divided into three main classes; the Japanese or Oriental, the Native American and the European.

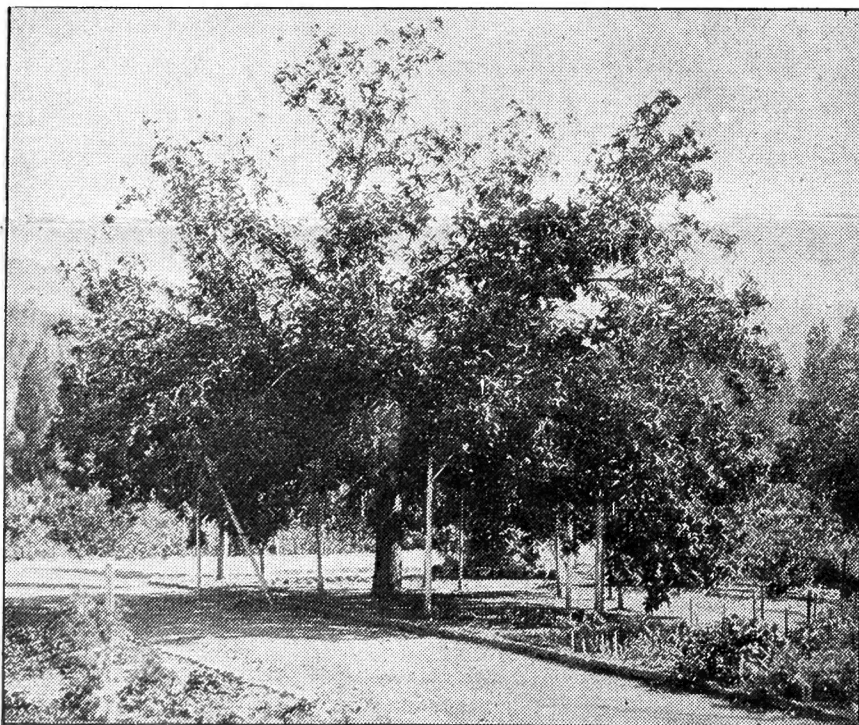
The Japanese nuts are very large, while the trees are usually small and come into bearing early, but in most localities they are undesirable as they are not very hardy and many crops may be lost through frost. The quality of the nut, furthermore, is inferior.

The Native American or Sweet chestnut, is indigenous to most of the States east of the Mississippi River. Although it is slow in development and comes into bearing late, when matured it makes one of the finest shade trees known. When crossed with the European sorts, this type has produced some of the best of the named varieties.

THE EUROPEAN TYPES

The European (commonly called Italian, Spanish and French or French Marron) all are of the same origin. The color "maroon" comes from the word Marron (chestnut color).

The European variety can be distinguished from the American Sweet or its hybrids by the small amount of fuzz about the point. The amount on the American Sweets is much greater, sometimes nearly covering the nut. The



A Mature French Chestnut—Marron Combale Variety



3-Year-Old Paragon Tree

European sorts usually are of good size, some of the named varieties being very large. Some are of very good quality, but their value is in their size and fine, glossy appearance. They bloom late in the spring (last of May to early in June) so that they are practically a sure crop in frosty districts.

They bear heavily and regularly, form a handsome tree and from the growers' and market viewpoints, are unequaled. The only disadvantage of the European type, however, is that the skin is astringent, but since most of them are cooked before eating, the skin is removed readily; in fact, it should not be eaten, as it is indigestible.

When the European is crossed with the American Sweet, this difficulty is modified or eliminated. Of the named varieties most generally cultivated I give herewith a brief description:

Marron Combale—Nut, very large, round, medium brown; wood, yellowish; leaves, brown, narrow and glossy. Very productive. Origin, France.

Marron Nouzillard—Nut, very large, flat, light brown; wood, reddish brown; leaves, wide and glossy. Buds have a sort of "shoulder." Productive and precocious. Origin, France.

Marron Quercy—Nut, medium to large round; dark rich brown, glossy and handsome, good quality, good bearer, usually one nut in a burr. Wood ashy; leaves, brown, very large, but not very glossy. Precocious. Origin, France.

Numbo—Nut, medium-large, roundish, medium light brown, quality fair; tree, vigorous, and heavy, regular bearer. Origin, doubtful, probably European.

Paragon Syn Sober Paragon—Nut, fair size, roundish, of only fair quality, rather starchy, a good bearer. Origin, Germantown, Pa., from seed of Spanish type.

Ridgely—Nut, fair size, two or three to the burr, flavor good; tree, vigorous and productive, European type. Origin, Dover, Delaware.

Rochester—Nut, fair size, quality very good, a good bearer. (Any of the above would sell for Italian or Spanish and the very large ones for French Marrons.)

GRAFTING AND BUDDING

Grafting and budding both succeed with the chestnut. The skilled grafter can get good results with the methods

used for other trees, but the novice must experiment before he attains success.

Valuable information may be derived from the U. S. Department of Agriculture Bulletin No. 700 on Pecan Culture, (obtainable free from the Division of Publications, U. S. D. A., Washington, D. C.). This bulletin gives in detail different methods of grafting and budding which can be used for the chestnut as well as the pecan.

VARIOUS GRAFTING METHODS

Whip grafts on small shoots or stocks the size of a lead pencil or slightly larger, or cleft grafts on shoots, one-half to one and a half inches, or the bark graft on larger growth, probably will give the largest measure of success. The bark graft on shoots of from one-half inch to five inches is more successful for the novice, as it is very simple.

In any method of grafting the chestnut, it is essential that great care be used in waxing, and then re-waxing after about two weeks. The wax should cover the cuts made in the stock and scion and should be applied immediately after inserting the latter.

The scion also should be waxed for its entire length, so that the job is sealed from top to bottom; not even bubbles should be left. Another precaution is to cover the whole by tying a paper bag over the top.

Thorough preparation of the soil before planting is essential. Anything that can be done afterwards will not make up for a failure to observe this rule. Blasting may be necessary and usually is beneficial if the ground is not too wet.

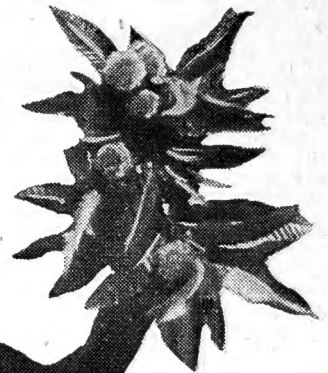
For orchard plant-

ing, the trees should be placed at distances of 40x40, 50x50 and 60x60 feet. On good land the latter distance is preferable. In order to have a greater number of trees to the acre the best plan is to have the distance between trees in the row 20 feet, 25 feet or 30 feet, and the rows 40 feet, 50 feet or 60 feet apart. In this event, however, it will be necessary to remove every other tree after they reach a certain size. This latter plan is better than planting the entire orchard 20x20, 25x25 or 30x30 and later removing part of the trees.

A good distance between the rows provides for better growth, and furthermore, the inter-planted tree may be left a number of years longer. Again, the wide row permits inter-planting to vegetables or berries. In any event, it is a serious mistake to crowd chestnut trees.

METHOD OF PLANTING

After staking out the ground in the usual manner, dig holes 2½x2½ feet, then break down the top soil around the rim, allowing it to fall into the bot-



tom of the hole. Always use fine top soil around the roots, and firm the soil well by treading.

Before planting, cut with a knife all broken or bruised roots and clip the end of roots and cut the end of every root. Use only mellow top soil about the roots and firm it well by treading. Leave surface soil loose.

PROTECTION FROM SUN

During the first year or two, chestnut trees must be shaded. A good method is to protect the young trees with yucca or paraffined paper protectors, or the trunk may be wrapped, to branches, with burlap or paper, care being taken not to tie so tight as to interfere with the flow of sap.

In planting the chestnut (or any other tree) it is well to set no deeper than the tree was planted in the nursery, and to set in the same position. As a rule, this can be determined by the appearance of the bark, the north side being greener than the south side. Less loss from sunburn will result if the southern side, hardened by exposure, again is placed to the south.

After planting, cut back



the top to about four and a half feet if the tree is a straight whip, but if it is branched at about this height, shorten the branches down to within two or three buds from the trunk. A small tree, under three feet, should be cut down to within three or four buds from the ground, the strongest shoot being allowed to grow to form the trunk and being headed the following season.

Staking the young trees is desirable, but not usually necessary.

IRRIGATION

As in the case of many other trees, the chestnut will produce without irrigation, but a larger tree and consequently a larger yield, will result if water is applied.

While the tree is young, regular irrigation is very desirable, but if water is unavailable, the young tree may be brought into bearing without it.

In the case of the unirrigated orchard, greater care in preparation and planting is necessary, as well as more attention to cultivation.

FREQUENCY OF IRRIGATION

Unless inter-crops are grown, irrigation may be limited to one application a month during the growing season, after the trees are in bearing. But young trees, before the bearing age, usually require water twice a month. It is essential that the water penetrate well into the sub-soil.

With a long iron rod or a soil auger the irrigator can test the penetration and gauge the application of water accordingly.

Light irrigation induces shallow rooting, which is very undesirable.

Do not continue irrigation too late in the growing season as it is likely to make the nuts crack open and over-develop them. Cracked nuts soon spoil and mold.

Cultivation must be thorough so that free growth is promoted. After maturity, cultivation need not be so intensive.

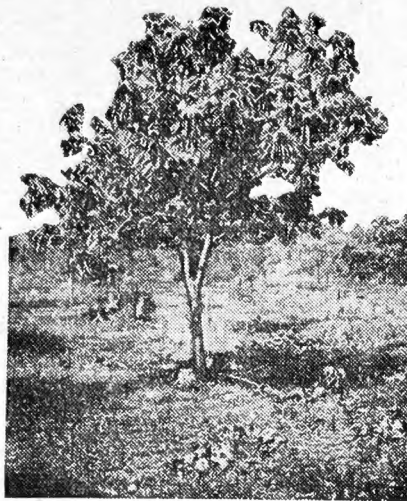
Old trees, even when given little care, seem to bear heavily. In Nevada City trees that have had no care for years each year bear heavy crops of marketable nuts.

During the first few years it is advisable to hoe around the tree by hand, but after the tree is well established, annual plowing, or on light soils, a good discing in the spring, with cultivation after each irrigation, will be sufficient.

While the planting of annual cover crops is not necessary, if practiced, it should be started the first year so as to build up a rich soil for the future.

PRUNING

At the end of the first year, pruning should be commenced with the idea of training the young tree. Only three or four shoots, well branched about the stem, should be allowed to grow to form the main scaffold limbs. Once these are branched to the owner's satisfaction, the only pruning needed



Paragon Chestnut at 8 Years

is to keep cross limbs out and keep the head open. It is absolutely necessary if one is to harvest large crops of large nuts. This does not mean that the center must be pruned in goblet shape, like a pear or apple tree. Simply let the tree develop naturally, but do not let it become bushy.

If grafted trees show a tendency to bear heavily while young, the burrs should be thinned out so that very few are left; otherwise the tree will grow out of shape and be retarded in its development.

HARVESTING

Allow the burrs to mature thoroughly, and fall of their own weight. Some varieties stick so that shaking or jarring the limbs must be resorted to. On other varieties the burrs will open so that the nuts fall to the ground. Burrs which fall and do not open, easily can be made to "shed" their nuts by pressure of the feet or by striking with a small wooden mallet.

Some use heavy leather gloves and twist them out by hand. A short stick, turned up on end like a hockey stick, is very helpful.

The nuts should be picked up every morning and stored in sacks, if they are to be shipped at once. If they are to be kept for a while, they should be thrown in a heap on the floor of a shed, to sweat. The pile should be stirred twice a day for two days; then the nuts may be sacked.

Always store chestnuts so that air can circulate freely. Never pile sacks one on top of another for any length of time, or they will heat and mold. If lack of space necessitates stacking, place sticks between the sacks to give ventilation, and do not pile too deep.

In gathering the nuts, have two pails—one for first grade, perfect nuts, and the other for culls and second size. Even the use of three pails may be advisable, for firsts, seconds and culls. Seconds and culls mixed with firsts bring down the price. Nuts of large size with split skins should be placed with the culls as they mold easily.

IS CROSS-POLLINATION NECESSARY?

Chestnuts at first bearing, develop a great many burrs but few contain nuts. This has been erroneously cited as due to the lack of cross-pollination, and has been said to indicate that the chestnut will not bear when planted by itself.

With seedlings and grafted trees, a mixture of varieties will give better results, but the fact that only a few burrs develop nuts really is a provision of nature, for if all the burrs were filled, the tree could not stand the weight, nor develop the nuts to a marketable size.

UNLIKE OTHER TREES

It is a well-known fact that all of our cultivated trees do not develop every blossom into fruit. The peach and plums set so many that a great expense is involved in thinning to get fruit of market size. Pears and apples shed the un-pollinated blossoms soon after blossoming, but the chestnut holds every burr whether empty or full, until harvest time. Mature trees yielding from 100 to 300 pounds of nuts will have a great many empty burrs.

MISCELLANEOUS HINTS

Here are a few brief hints and random notes concerning chestnuts:

Always ship in double sacks, as every trainman or handler seems to feel that something gives him the right to sample them. Observation of the double-sack rule will save the shipper much loss and trouble.

Following is a method of preservation if it is desired to keep the nuts in a bright, plump condition through the winter months for home use: Place the nuts in five-gallon oil cans or tight boxes and cover with two or three grain sacks. Dump out once a week and allow them to air for a half hour or more, keeping in cool shed or dry cellar.

A pest of the Eastern States is a small worm which is the larvae of the chestnut weevil. So far as I know, this pest never has made its appearance on the Coast. In order to prevent its introduction, Native American Sweet chestnuts or any others produced in the Eastern States should not be brought into California.

Cull chestnuts can be used safely for fattening poultry and hogs. Cattle also will eat them. In fact, it is necessary to fence out stock from bearing trees if you wish to save the crop during the harvest season!

This pamphlet is a resume of a series of three articles prepared by Mr. Parsons for ORCHARD and FARM and published in the March, April and May, 1922, numbers of this magazine.